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ABSTRACT

A sample of 2,290 airmen who were eligible for promotion to grades E-4 through E-7 was used to field-test the proposed weighted Airman Promotion System. Data included scores on the Specialty Knowledge Test and the Promotion Fitness Examination, points credited for time in grade, time in service, decorations, and Airman Performance Report mean overall evaluation. Average promotion board scores were computed by dividing each airman's raw board score by the number of members on the promotion board and multiplying the quotient by 10. Two weighted factor scores, one including and one excluding the average board score, were developed. The hypothesis tested was that inclusion of the board score component in the weighted factors composite score did not have an effect on the ranking of the airmen. Rankings of individuals on the weighted factors composite were found to be essentially unaffected by inclusion of the promotion board score. It was concluded that using a board score factor merely inserted a non-visible component which would obscure explanations for nonpromotions. (Author/BC)

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By

Janos B. Koplyay

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FIELD TEST OF THE WEIGHTED AIRMAN PROMOTION SYSTEM: PHASE I. ANALYSIS OF THE PROMOTION BOARD COMPONENT IN THE WEIGHTED FACTORS SYSTEM

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FOREWORD

This research was completed under Project 6323, Personnel Management Research and Development; Task 632305, Development of Statistical and Mathematical Procedures to Facilitate Personnel Research.

This report has been reviewed and is approved.

F.L. McLanathan, Lt Col, USAF
Chief, Personnel Research Division

ABSTRACT

For the purposes of field testing the proposed Weighted Airman Promotion System, the Alaskan Air Command supplied data on 2,835 airmen eligible for promotion to grades E-4 through E-7 in the FY 69-B promotion cycle. Data included scores on the Specialty Knowledge Test and the Promotion Fitness Examination; points credited for time in grade, time in service, decorations, and Airman Performance Report mean overall evaluation; and ID information. Cases for which test scores were unavailable were eliminated; the final sample consisted of 2,290 airmen, 81 percent of the original eligibles.

Average promotion board scores were computed by dividing each airman's raw board score by the number of members on the promotion board and multiplying the quotient by 10. Weighted factors scores were computed by adding the factor scores. Two such total composite scores were obtained: a weighted factors score excluding the average board score and a weighted factors score including the average board score. The analyses concentrated on the comparisons of these two total composite scores. The hypothesis tested was that inclusion of the board score component in the weighted factors composite score does not have an effect on the ranking of the airmen. Ranks on the composite total scores with and without the board score were analyzed for strength of relationship. Average board scores were analyzed for differences in scoring across Air Force Bases and by different size board panels.

The following results were obtained: (*a*) There were significant differences in average board score means between Elmendorf and Eielson AFBs for grade E-3 personnel. (*b*) There were significant differences in average board score means between 3-member and 5-member board panels. (*c*) There was a very high, near perfect relationship between weighted factors composites excluding and including the board score component. (*d*) Rankings of individuals on the weighted factors composite were essentially unaffected by inclusion of the promotion board score.

Since inclusion of a board score component had a negligible effect on the ranking by composite total score, and since means of board scores differed between bases and between boards with different panel sizes, it was concluded that including a board score factor merely inserted a non-visible component which would obscure explanations for non-promotion.

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FIELD TEST OF THE WEIGHTED AIRMAN PROMOTION SYSTEM: PHASE I. ANALYSIS OF THE PROMOTION BOARD COMPONENT IN THE WEIGHTED FACTORS SYSTEM

I. BACKGROUND

As an outgrowth of the requirements for efficient, equitable promotion procedures which permit consideration of an optimum number of variables in the selection of airmen for promotion, a selection model has been designed and proposed for implementation. Part of the initial phase of this work, the field testing of the Weighted Airman Promotion System, is the subject of this report.

Under existing procedures in the Air Force, airman promotions are carried out by means of promotion boards. These boards, consisting of three or five panel members, are convened for each promotion cycle to review a given number of folders of airmen who are eligible for promotion. Each board member assigns points for each airman (not less than 1 and not more than 10 points) to reflect his judgment about the merits of the performance documented in the airman's folder. Promotion board scores, i.e., the sum of the scores for each airman given by these panel members, are reported to the major commands. The airmen are ranked from high to low on their board scores; ties in rankings are broken by crediting points for time in grade, time in service, Airman Performance Report rating, and decorations. Then selections for promotion are made according to quotas assigned for the different Air Force Specialties. Going down from high to low on the promotion board score ranking, the quota for each specialty is filled.

During February and March 1968, research was conducted at the Personnel Research Division to develop a model for a new airman promotion system that could substitute for the present promotion system. Hopefully, the new system would provide more visibility to each airman in terms of numeric values on selected variables, which would in turn provide the airmen with an indication of how to increase his probability for promotion, or would give him evidence and information about the reasons he was not promoted.

The brief description of this initial research which follows provides a background for the present study. A group consisting of 15 officers (7 Colonels, 2 Lt Colonels, and 6 Majors) and 16 noncommissioned officers (3 Senior Master Sergeants and 13 Chief Master Sergeants) served as teams to provide judgments of over two-thousand airmen who were eligible for promotion from grade E-5 to E-6. These selected judges were extremely well qualified, highly experienced personnel who were among the most competent persons in the Air Force to determine the relative merits of airmen eligible for promotion. The task of the Personnel Research Division was to capture the policy of these judges in ranking the individual airmen or, in other words, to build a mathematical model identifying and reproducing as closely as possible the relative weights of the variables used by the judges in ranking the airmen for promotion. A model, derived from the selection policy of the largest, most consistent, and homogeneous group of judges, was recommended for adoption. This model with its weighting of selected variables gives the visibility, equity, and consistency over time desired in a system used to promote enlisted personnel.

The merits and desirability of this new weighted factors promotion system were discussed at length during the USAF Airman Promotion Conference held in April 1968. The general consensus was that selection for promotion could be based either completely or to a great extent on the mathematical model consisting of the major selection factors, with little or no requirement for inclusion of a promotion board component as is currently used. The alternate solution of providing promotion boards with weights and factors to consider appeared to introduce excessive cost without enhancing the degree of visibility of the individuals under consideration. After more intensive discussion, the proposed weighted factors system developed by the Personnel Research Division, with factors and weights as proposed by the Division and modified by the panel of judges, was recommended for implementation at the earliest feasible date.

The weighted factors promotion system was approved by the Secretary of the Air Force on 3 July 1968 and was subjected to a field test in the Alaskan Air Command. The purpose of the field test was to obtain tangible information with regard to the feasibility of the new system itself, to determine the relative contribution of a promotion board score to the weighted factors composite score, and to validate the Promotion Fitness Examination. The field test can thus be summarized under three major phases:

1. Analysis of the effects of the promotion board score on predictive efficiency of the weighted factors composite score.
2. Validation of the weighted Airman Promotion System.
3. Validation of the Promotion Fitness Examination.

This report is a summary of the first phase dealing with the effects of the promotion board score on the proposed weighted factors system. The second and third phases, i.e., validation of the weighted factors system itself and validation of the Promotion Fitness Examination, are reported separately because these phases attempt to answer entirely different kinds of questions.

II. EXPLANATION OF THE WEIGHTED FACTORS SYSTEM

The components derived from the initial analysis of the selection policy of the panel of judges included scores for the Specialty Knowledge Test, the Promotion Fitness Examination, time in grade, time in service, decorations, and the mean overall evaluation from Airman Performance Reports, with a possible additional component – a promotion board score. Appendix I shows the factors and the maximum points for each, with an explanation of their use and computation for grades E-4 through E-7. Also indicated are two alternative scoring procedures, one with the inclusion of a promotion board evaluation and the other with no promotion board component.

It should be emphasized that the points indicated in Appendix I are maximum obtainable points. There is, of course, a very small probability that the maximum total points can be obtained by any one airman. In order to obtain the maximum number of points, an airman would have to obtain perfect scores on the factors involving tests (190 points), have a minimum of 20 years in service (40 points), have 10 years in grade (60 points), and have been awarded decorations for the maximum number of points (25 points: Medal of Honor, 15 points; Air Force Cross, 9 points; and one other decoration or some equivalent recognition for heroism, 1 point). The small probability of occurrence of a maximum total score limits the interpretation of these points in terms of percentage of contribution to the total score as shown in the appendix. Thus, no attempt should be made to assert that the score on the Specialty Knowledge Test, for instance, "contributes" 17 percent to the total score, or that the contribution of decorations is 5 percent. In fact, the percentage of contribution of an individual factor depends entirely on the individual scores on these factors in each airman's case. The percentages indicated in the appendix are valid only if the values for all factors are maximum. More explicitly, the percentages shown are not predetermined but, rather, are derived from the values in *this* particular example, showing *in this case* the relative contribution of each factor to the total score.

Another point that should be kept in mind is that any weighted system is in a sense an arbitrary judgment of the group of people assigning the weights. In this instance, the weights derived and proposed were based on the captured policy of a team of Air Force managers. There is no guarantee that the policy of this group, or the weights arrived at by capturing their policy, would necessarily be strongly related to the judgment or policy of any one of the existing promotion boards. In fact, it is entirely possible that policies and weights used by different promotion boards would have differential values if analyzed mathematically. The aim of validation, however, will be to find an indicator expressing the degree of agreement between the lists of incumbents selected by a promotion board and those selected by the weighted factors system. Validation of the system is discussed in a separate report.

In the present discussion, the contribution of the promotion board score to the weighted factors composite is considered, as well as the possibility and effects of eliminating this factor altogether. The nature of this discussion forces two basic assumptions: First, that the weighted factors promotion system is accepted for implementation; and second, that the weights used are accepted as proposed. The only topic addressed by this report is the question of retention or elimination of the promotion board component.

III. PROCEDURE

Data Collection

Data for the study were collected on personnel in the Alaskan Air Command. The data were compiled during the period 5 August 1968 to 1 October 1968 at Elmendorf and Eielson Air Force Bases for airmen in pay grades E-3 through E-6 who were eligible for promotion during the FY 1969-B promotion cycle. These cases did not include airmen at remote sites for whom no attempt was made to obtain Promotion Fitness Examination scores. Data included Specialty Knowledge Test scores, Airman Performance Report scores, Time-in-Grade scores, Time-in-Service scores, Decorations scores, and Promotion Board scores. The latter were given in raw score form; the maximum possible promotion board score was 30 for 3-member panels and 50 for 5-member panels. Elmendorf Air Force Base had both 3-member and 5-member panels, while Eielson used 5-member panels only. The score card work-deck format is shown as Appendix II. In addition to the factors described, the data cards included other dates and information, together with computed total composite score. This total score, however, did not include the Promotion Fitness Examination score. Further, the inclusion of a promotion board score with differing upper limits made it necessary to recompute a weighted factors composite score in which the board score component was adjusted for differences in panel size. Of the 2,835 cases for whom data were received, some were excluded either because no Specialty Knowledge Test scores were available or no Promotion Fitness Examination scores were available. Two other exclusions were caused by out-of-range data. Table 1 summarizes the sample used in the study.

Table 1. **Study Sample by Pay Grade**
(N = 2,290)

Cases	E-3	E-4	E-5	E-6
Airman Eligible for Promotion	605	1,130	619	481
Cases Excluded	50	280	105	110
Total for Pay Grade	555	850	514	371

Promotion Fitness Examination Score

An experimental form of the Promotion Fitness Examination was administered to personnel in the Alaskan Air Command. Answer sheets from a total of 2,578 examinees were scored at the Personnel Research Division and were added to the information already received on those examinees from the Alaskan Air Command.

Time-in-Grade and Time-in-Service Scores

To assure maximum accuracy, Time-in-Grade and Time-in-Service scores were recomputed using Date of Rank (DOR) and Total Active Federal Military Service Date (TAFMSD) and the date 1 January 1969 for airmen in grade E-3 and 1 May 1969 for airmen in grades E-4 through E-6. Results were distributed against the Time-in-Grade and Time-in-Service scores supplied by the Alaskan Air Command. There was only one case for which the given Time-in-Service score differed from the computed one; this discrepancy, of course, was corrected.

Average Promotion Board Score

Before total composite weighted scores could be computed, a decision was necessary regarding use of the promotion board scores in their raw score form since the promotion panels were of two different sizes. Means and standard deviations were computed by grade, by Air Force base, and by number of panel members. These computations were used to determine whether scores would have to be standardized or whether some kind of average board score could be used with an adjustment for the difference in panel size.

Table 2 summarizes the means, standard deviations, and number of cases in each category for the promotion board raw scores. It is apparent from the table that variances were similar enough to permit computation of an Average Board Score for each airman. This was done for each airman by dividing his score by the number of panel members and multiplying this quotient by 10 to obtain a range between 1 and 100 as required and shown in Appendix I (Board Evaluation maximum points = 100).

Table 3 summarizes the means and standard deviations of the computed Average Board Scores by grade, by Air Force base, and by number of panel members. A fairly sizable difference is indicated between the means of airmen in grade E-3 with 5-member panels (mean = 79.46) and 3-member panels (mean = 63.67). This difference (79.46 - 63.67 = 15.79) is statistically significant beyond the .0001 level of confidence. One might conclude, then, that a difference between the two means of these groups could happen less than once out of 10,000 times by chance alone. There appears to be a strong interaction between the size of the board panel and the mean score. A comparison between the means of grade E-3 airmen at the two bases for groups having 5-member panels reflects a statistically significant difference beyond the .01 level of confidence. In other words, the difference between these means (79.46 for Elmendorf and 75.18 for Eielson) could happen only less than once out of 100 times by chance alone. Although no other significant differences are apparent from Tables 2 and 3, it is safe to conclude that promotion board scores in certain instances show significant differences when compared between different locations or even within the same location when the panel size is different. This conclusion cannot be generalized from the available data since this study deals with only two locations; however, there is a strong likelihood that one would find similar differences dealing with other promotion boards.

Table 2. **Promotion Board Raw Score Means, Standard Deviations, and Number of Cases by Grade, AFB, and Panel Size**

		Raw Scores								
		Elmendorf			Eielson			Total		
Grade	Board Members	N	Mean	SD	N	Mean	SD	N	Mean	SD
E-3	5	38	39.73	5.17	129	37.59	3.25	167	37.95	4.23
	3	388	19.10	3.49	-	-	-	388	19.10	3.49
E-4	5	612	36.87	4.65	238	36.53	4.53	850	36.77	4.62
E-5	5	406	34.76	4.00	108	34.75	3.29	514	34.77	3.70
E-6	5	301	37.94	4.22	70	38.74	3.66	371	38.08	4.13
Total	3	388			-			388	19.10	3.49
	5	1,357			545			1,902	36.59	4.43

Table 3. **Average Board Score Means, Standard Deviations, and Number of Cases by Grade, AFB, and Panel Size**

		Average Board Scores Times 10								
		Elmendorf			Eielson			Total		
Grade	Board Members	N	Mean	SD	N	Mean	SD	N	Mean	SD
E-3	5	38	79.46	10.34	129	75.18	6.50	167	75.90	8.46
	3	388	63.67	11.63	-	-	-	388	63.67	11.63
E-4	5	612	73.74	9.30	238	73.06	9.06	850	73.54	9.24
E-5	5	406	69.52	8.00	108	69.50	6.58	514	69.54	7.40
E-6	5	301	75.88	8.44	70	77.48	7.32	371	76.16	8.26
Total	3	388			-			388	63.67	11.63
	5	1,357			545			1,902	73.18	8.86

Weighted Factors Score

The individual variables were distributed by grade. Weighted factors composite scores were computed two ways: First, the weighted factors composite score excluding the average promotion board score (Weighted Factors Score Without Average Board Score), and second, the weighted factors composite score including the average promotion board score (Weighted Factors Score With Average Board Score).

Distribution of the Average Board Scores revealed, as expected, a high incidence of ties. Appendix III shows the number of ties and the number of actual promotions at the promotion quota cutoff points by grade. For instance, for grade E-4, there were 212 promotions (quota cutoff point). Out of the total sample of airmen in grade E-4 (850), there were 66 ties in Average Board Score for rank 212. Twenty-nine of these 66 ties were actually promoted; 37 of the ties were not promoted.

The high incidence of ties reflects the limited discrimination power of board scores when grades are analyzed without further breakdown by Control Air Force Specialty Codes (CAFSC). However, even though the number of ties within a particular CAFSC may be smaller, the probability of ties in board scores is still much larger than the probability of ties in weighted factors total scores. The implication is that there is a better discrimination using the Weighted Factors Score With Average Board Score than there is using the Average Board Score alone. One could argue that in the case of a tie, the board "takes another look" at the individuals' records in order to break the tie. However, one could also argue that if this "other look" differentiates the individuals, then either the "first look" was erroneous (that is, there should not have been a tie), or this "second look" is a factor which is invisible to the airman and is not detectable or measurable by any particular mathematical model.

IV. EFFECTS OF THE AVERAGE BOARD SCORE ON THE WEIGHTED FACTORS SCORE

Results Obtained for Total Sample with a Maximum Board Score Component of 100

The basic question of this phase of the investigation is: What effect, if any, does inclusion of the promotion board component in the weighted factors system have on the ranking of individuals?

To answer this question, each airman within each grade was ranked on three variables: (*a*) Weighted Factors Score Without Average Board Score, (*b*) Weighted Factors Score With Average Board Score, and (*c*) Average Board Score. Analyses were performed at different hypothetical promotion percentage quotas of 20, 30, 40, and 50 percent. That is, airmen were ranked by Weighted Factors Score Without Average Board Score, and the first 20 percent of the particular grade (114 for E-3, for example) were analyzed in terms of matches between these ranks and ranks on the Weighted Factors Score With Average Board Score. These percentages were computed as ± 1.5 percent to accommodate for ties. For example, for grade E-3, 20 percent of 555 is 111. Because of ties, the quota number 114 was chosen instead. Of these 114 airmen, there were 102 whose ranks on the Weighted Factors Score Without Average Board Score and on the Weighted Factors Score With Average Board Score were both better than 114. The ratio of 102 to 114 (89.5 percent) represents the overlap between the two ranks. This ratio indicates the effects of adding the board score component to the weighted factors score. That is, 89.5 percent of the individuals who would have been promoted using the Weighted Factors Score Without Average Board Score would have also been promoted by the Weighted Factors Score With Average Board Score. The rank overlap and overlap percent (or index) is defined in this study as the number of the corresponding percentage of individuals who could be promoted by both promotion systems when the two systems are compared, or the number and percentage of individuals who would actually have been promoted by a system when this system is compared with actual promotions.

Table 4 summarizes these rank overlaps by grade. The table also includes the overlap at the actual promotion quota cutoff point (478 for grade E-3, for example). It can be seen from the table that the lowest overlap index is 87 percent, but that the majority of these percentages are at the 90 percent level or higher. This implies that the ranking of individuals in terms of the weighted factors Score Without Average Board Score changed very little when ranking was in terms of the Weighted Factors Score With Average Board Score.

Table 4. **Overlap Between Ranks on Weighted Factors Scores With and Without Average Board Score**

Hypothetical Promotion Quota	Promotion Quota N	Number Ranks on Both Scores Exceeding Quota Cutoff	Percent Agreement Between Ranks	Promotion Quota N	Number Ranks on Both Scores Exceeding Quota Cutoff	Percent Agreement Between Ranks
	Grade E-3			Grade E-4		
20%	114	102	89.5	170	153	90.0
30%	166	156	94.0	255	230	90.2
40%	222	205	92.3	341	323	94.7
50%	269	249	92.6	422	400	94.8
Actual Promotions	478	467	97.7	212	192	90.6
	Grade E-5			Grade E-6		
20%	105	100	95.2	77	69	89.6
30%	154	147	95.5	110	98	89.1
40%	207	201	97.1	149	139	93.3
50%	257	251	97.7	189	177	94.7
Actual Promotions	89	81	91.0	46	40	87.0

Table 5 summarizes the intercorrelations between the Weighted Factors Score Without Average Board Score and the Weighted Factors Score With Average Board Score. From the table, it is clear that there is a strong relationship between the two variables. In fact, the correlations are near perfect. Again, it is clear that adding the board score component to the weighted factors score has very little, if any, effect upon the ranking of the individuals or upon their total weighted factors score. In other words, adding the board score has the effect of adding a near constant to every score, thus increasing the total score but changing the ranking very little. Table 6 summarizes the intercorrelations between rankings on the Weighted Factors Score Without Average Board Score and the Weighted Factors Score With Average Board Score.

Table 5. **Intercorrelations Between Weighted Factors Scores With and Without Average Board Score**

Grade	Intercorrelation Between Variables
E-3	.9741
E-4	.9814
E-5	.9857
E-6	.9826

Table 6. **Intercorrelations Between Ranks on Weighted Factors Scores With and Without Average Board Score**

Grade	Intercorrelation Between Variables
E-3	.9733
E-4	.9801
E-5	.9871
E-6	.9871

Results Obtained for Total Sample with a Maximum Board Score Component of 200

A maximum of 100 points for the proposed board score component for the weighted factors system was specified as the value to be investigated in this field test. The assignment of this maximum value was made independently from the assignment of values for the other factors in the construction of the weighting system. Since a board score component was not a factor in the policy capturing exercises which yielded the weights for the other factors, the assignment of a 100-point maximum was, in a sense, a rather arbitrary decision. Before the results of this field test became available, it was impossible to predict with any assurance whether the board score component would significantly affect the ranking of incumbents for promotion as determined by a weighted factors system. Results of the preceding analysis indicated that a 100-point maximum board score component introduces virtually no change in the ranking of individuals based on a weighted factors score which includes no board score component.

In an effort to determine whether a larger board score component would produce significant changes in the ranking of individuals, the size of the board score component was doubled, and the relationships were studied between the Weighted Factors Score Without Average Board Score and a score with the board score component increased, the Weighted Factors Score With Accentuated Average Board Score. The maximum board score for this trial system was 200 points. Ranks on the Weighted Factors Score Without Average Board Score were compared with ranks on the Weighted Factors Score With Accentuated Average Board Score. These comparisons, together with comparisons of ranks obtained when the 100-point maximum board score was used, are presented in Table 7.

The values in Table 7 imply that doubling the board score component does not, in general, decrease the overlap between Weighted Factors Scores With or Without Average Board Score. For example, 96.2 percent of grade E-4 personnel who would have been promoted by the weighted factors system excluding the board score component would also have been promoted by the weighted factors system using the 200-point maximum board score component. In the same grade, this percentage was 90.1 percent when the 100-point maximum board score component was used. Doubling the size of the board score component does not appear to decrease the number of matches (overlap ranks), or the number of individuals who would be promoted by both systems (Weighted Factors Scores With and Without Average Board Score). It seems apparent, then, that even with its value doubled, the inclusion of a board score component in the weighted factors composite system fails to influence the ranking of airmen.

Table 7. **Overlap Between Ranks on Weighted Factors Scores Without Average Board Score vs. Weighted Factors Scores with Average Board Score (Using 100-Point Maximum) and With Accentuated Average Board Score (Using 200-Point Maximum)**

Weighted Factors Scores Compared	Promotion Quota Cutoff	Number Ranks on Both Scores Exceeding Quota Cutoff	Percent Agreement Between Ranks	Promotion Quota Cutoff	Number Ranks on Both Scores Exceeding Quota Cutoff	Percent Agreement Between Ranks
	Grade E-3			Grade E-4		
Without Board Score *vs.* With Accentuated Board Score	478	429	89.8	212	204	96.2
Without Board Score *vs.* With Board Score	478	467	97.7	212	197	90.1
	Grade E-5			Grade E-6		
Without Board Score *vs.* With Accentuated Board Score	89	84	94.4	46	46	100.0
Without Board Score *vs.* With Board Score	89	81	91.0	46	40	87.0

Results Obtained for Selected CAFSCs

The sample from the Alaskan Air Command (N = 2,290) did not lend itself to complete analysis by CAFSC. Most specialties had small frequencies of eligible airmen. It was possible, however, to select a few CAFSCs with enough airmen who were eligible for promotion to conduct a meaningful mathematical analysis. Table 8 shows the number of eligible airmen by grade and by CAFSC. Some of the frequencies were rather small due to the attempt to analyze the same CAFSCs across the four grades.

Essentially the same type of analysis was performed on these selected CAFSC groups as was carried out in the case of the total grades. For each CAFSC group, the Weighted Factors Scores Without Average Board Score were correlated with their Weighted Factors Scores With Average Board Score. These correlations, also shown in Table 8 by grade and by the selected CAFSCs, serve as indices of the effect of adding the board score component to the weighted factors score. As expected, the analysis of the weighted factors scores with and without the board score showed an even more marked relationship when broken down into CAFSCs. The near perfect correlations ranged from .9726 to .9941. The addition of the board score component seems to have little or no effect on the relative ranking of the individuals on the weighted factors score.

Table 8. **Intercorrelations Between Weighted Factors Scores With and Without Average Board Score by Selected CAFSCs and by Grade**

	431XX		631XX		645XX		647XX		702XX		811XX	
	N	r	N	r	N	r	N	r	N	r	N	r
E-3	49	.9768	23	.9836	41	.9726	32	.9806	25	.9789	108	.9770
E-4	55	.9815	74	.9926	57	.9869	35	.9854	50	.9870	35	.9914
E-5	34	.9879	42	.9838	44	.9851	10	.9941	42	.9675	25	.9843
E-6	31	.9872	17	.9927	25	.9870	11	.9846	33	.9759	13	.9746

V. SUMMARY AND CONCLUSIONS

A field test of the weighted factors promotion system was conducted using data furnished by the Alaskan Air Command. The sample included 2,290 airmen in pay grades E-3 through E-6 who were eligible for promotion. The analysis of this report concentrated on the contribution of the promotion board component to the weighted factors system and its effects on the relative ranking of the individuals.

Promotion board scores were converted to a scale with 100 as the upper limit. Weighted factors scores were computed with and without the average board scores. Factors of the weighted factors system were distributed and analyzed. The airmen in the study were ranked on both total scores, i.e., total weighted factors scores excluding the average board score and total weighted factors scores including the average board score. Overlaps in ranks on these two total scores were computed for various promotion percentage quotas and for the actual number of promoted individuals within each grade. The alternative total scores and ranks on these scores were also analyzed in terms of correlations. Separate and additional analyses were performed for selected CAFSCs where there were sufficient numbers of airmen eligible for promotion to permit meaningful analyses.

The following results were found from the analyses performed:

1. For airmen in grade E-3, promotion board scores differed significantly for 3-member and 5-member panels at Elmendorf Air Force Base.

2. Mean board scores at Elmendorf and Eielson Air Force Bases differed significantly for grade E-3 airmen, suggesting that board scores may in part be dependent on base of assignment.

3. Inclusion of the average promotion board score in the weighted factors score had little or no effect on the relative ranking of the individuals on the total weighted factors score. This was true for each grade and each selected CAFSC analyzed.

4. Giving more weight to the board score (i.e., doubling its value) did not change the relative ranking of individuals. Inclusion of the hypothetical "heavy" board score left rankings of individuals on the composite score practically unaffected.

The following conclusions are based on the two fundamental assumptions stated earlier, i.e., that the weighted factors promotion system is accepted as the new system for promotion and that the weights assigned to the factors are accepted as valid. In this light, there is conclusive evidence that addition of a promotion board score to the weighted factors score is unnecessary. Analyses of this study clearly show that addition of the board score to the composite score changes very little, if any, the ranking of the individuals on that composite score. In addition, airmen cannot interpret board scores since the components of board scores are not visible to them. Thus, under the assumptions of this study, the inclusion of a board score component appears to be unnecessary, as well as inconsistent with the visibility objective of the proposed weighted factors promotion system.

APPENDIX I: AIRMAN PROMOTION SELECTION FACTORS AND POINTS

Grades E-4 through E-7

Selection Factor	Computation With Board Score		Computation Without Board Score	
	Maximum Points	Percentage	Maximum Points	Percentage
Specialty Knowledge Test (SKT) Score	95	17	95	21
Promotion Fitness Examination (PFE) Score	95	17	95	21
Time In-Service (TIS) Score	40	7	40	9
Time-In-Grade (TIG) Score	60	11	60	13
Decoration Score	25	5	25	6
Airman Performance Reports (APR)	135	25	135	30
Board Evaluation	100	18		
	550	100	450	100

Explanation of Factors

The SKT and PFE will be administered annually.

Points for the SKT and PFE scores will be actual percentile scores obtained in these tests (in 5-point increments).

Time-in-Service will be computed by multiplying TAFMS by 2. Less than 6 months will count as 1 point; over 6 months will count a full year, 2 points. A cutoff score of 40 points, for 20 years TAFMS, has been established.

Time-in-Grade will be computed at the rate of ½ point per month up to a maximum of 120 months, 60 points; 15 days or less will be dropped, 16 or more will count as a full month.

Decorations will be assigned points according to their order of precedence. The maximum number of points attainable is 25. Decorations will count for promotion regardless of the military service in which they were earned.

The Airman Performance Report score is obtained by multiplying the overall evaluation mean by 15. The mean is based on reports for a 5-year period prior to the eligibility date, not to exceed ten reports.

The Board Score will be based on a review by the board that concentrates on those items not previously weighted; e.g., education level and efforts to improve self in terms of formal education, technical knowledge, etc. Reduced selection folder will consist of Category A favorable communications, APR word picture, and pages 2 and 4 of the Air Force Form 7.

APPENDIX II. SCORE CARD WORK-DECK FORMAT

DATA	CARD COLUMNS
Not Used	1
Air Force Service Number (AFSN)	4-11
Number of Board Members	12
Name	13-30
Date of Rank (DOR)	31-36
Total Active Federal Military Service Date (TAFMSD)	37-42
Control Air Force Specialty Code (CAFSC)	43-49
Board Score	50-52
Airman Performance Report (APR) Score	53-55
Decoration Score	56-57
Specialty Knowledge Test (SKT) Score	58-59
Time-in-Grade (TIG) Score	60-61
Time-in-Service (TIS) Score	62-63
Not Used	64-65
Total Score	66-69
Not Used	70-73
PAS	74-79
Not Used	80

APPENDIX III. TIED AVERAGE BOARD SCORES AT PROMOTION QUOTA CUTOFF